



Session 1



Numbers 1 through 3 are about a school Glee Club preparing for its winter concert. Show all of your work and write your answers directly in this booklet.

To find the cost of one gallon of paint, solve the equation $5n + \$5.23 = \109.73 , where n represents the number of gallons of paint. In the box below, provide the work that shows how you arrived at your answer.

1. **Introduction:** The first slide introduces the topic of "Introduction to the History of Mathematics." It includes a brief overview of the importance of mathematics in human civilization and a list of key milestones in the history of mathematics.

2. **Early Mathematics:** The second slide discusses the origins of mathematics, focusing on ancient civilizations such as the Egyptians, Babylonians, and Greeks. It highlights the development of basic arithmetic and geometry.

3. **The Renaissance:** The third slide explores the mathematical advancements during the Renaissance period, including the work of Leonardo da Vinci and the development of algebra and calculus.

4. **The Scientific Revolution:** The fourth slide examines the impact of the Scientific Revolution on mathematics, featuring the work of Isaac Newton and the development of calculus and differential equations.

5. **The 19th Century:** The fifth slide covers the mathematical developments of the 19th century, including the work of Carl Friedrich Gauss and the development of number theory and algebra.

6. **The 20th Century:** The sixth slide discusses the mathematical advancements of the 20th century, including the work of Albert Einstein and the development of relativity and quantum mechanics.

7. **Conclusion:** The final slide summarizes the key points of the presentation and emphasizes the ongoing importance of mathematics in modern society.



- 2** Janette, Carl, and Milo are performing a special number in costume during the concert. Each of their costumes will require $3\frac{1}{2}$ yards of material for the outfit and another $1\frac{1}{2}$ yards of material for the hat.

How much material is needed in all for the 3 complete costumes? In the box below, provide the work that shows how you arrived at your answer.

3

The Glee Club kept track of the attendance at each of their 4 performances. At the end of the 4 performances, they had the following information:

ATTENDANCE PER PERFORMANCE

Performance	Student	Adult
1	75	120
2	95	136
3	110	126
4	100	150

What was the adult mean (average) attendance at the concerts? In the box below, provide the work that shows how you arrived at your answer.

Recycling Program

Directions

Numbers 4 through 6 are about a recycling program. Show all of your work and write your answers directly in this booklet.

Your school started a recycling program to earn money to pay for some school activities and teach students about saving natural resources. The tables below show the number of pounds of aluminum cans and newspapers collected in 3 weeks by each grade. Study the tables. Then do Numbers 4 and 5.

GRADE 6

Week	Pounds of Aluminum Cans	Pounds of Newspapers
1	11.7	252
2	14.75	241
3	12.8	219

GRADE 7

Week	Pounds of Aluminum Cans	Pounds of Newspapers
1	12.1	288
2	13.2	227
3	14.0	254

GRADE 8

Week	Pounds of Aluminum Cans	Pounds of Newspapers
1	8.3	254
2	17.4	213
3	13.5	293

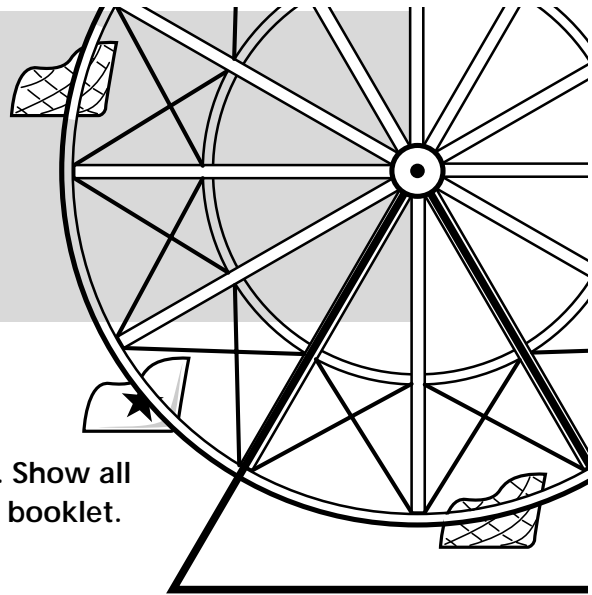
Go On

- 4** Which grade collected the ***greatest*** number of pounds of aluminum cans during the 3-week period? In the box below, provide the work that shows how you arrived at your answer.

- 5** What procedure could you follow to estimate the total number of pounds of aluminum cans collected by ***all*** of the grades at the end of a 10-week period?

- 6** Your class has decided to crush the cans to save space. A full-size can is 5 inches tall, while a crushed can is 1 inch tall. If 175 full-size cans will fit into a garbage bag, about how many crushed cans will fit into the same bag? In the box below, provide the work that shows how you arrived at your answer.

AMUSEMENT PARK



Directions

Numbers 7 through 9 are about an amusement park. Show all of your work and write your answers directly in this booklet.

- 7 A family of four wants to spend 4 days at the Fun Land amusement park. There are three options for purchasing individual entrance passes for Fun Land. The table below shows the prices for the different options.

PASS PRICES

Type of Pass	Price
One-day	\$27.95
Three-day	\$80.95
Five-day	\$134.95

Which pass or combination of passes will be the *least* expensive for a family of four to purchase during their stay at Fun Land amusement park? In the box below, provide the work that shows how you arrived at your answer.

Go On

- 8** The table below lists the costs of one-day passes at Fun Land over the last ten years.

**ONE-DAY PASS PRICES
AT FUN LAND**

Year	Price
1985	\$18.00
1987	\$19.00
1989	\$21.50
1991	\$23.00
1993	\$24.50
1995	\$26.50

If the trend in the cost of passes continues, what do you predict would be the cost of a one-day pass in the year 2005? In the box below, explain how you arrived at your answer.

9

Fun Land has two very popular games on the midway. One of the games has 3 different prizes you can win and the other game has 5 different prizes. How many different combinations of one prize from each game could a player win? In the box below, provide the work that shows how you arrived at your answer.



Directions

Show all of your work and write your answers directly in this booklet.

10

You and other members of the Truman Middle School Science Club have purchased a 35-gallon aquarium tank and all the accessories needed to keep tropical fish. Using the information in the following tables, you will decide which species of fish and plants to put into the tank. You must keep in mind the following restrictions:

- You must spend between \$65 and \$75.
- The combined lengths of the fish in inches must not exceed the number of gallons of water in the tank.
- The total number of plants should not exceed 10.
- You must purchase **at least** 5 kinds of fish and 2 kinds of plants.

On Page 15, construct a table that shows you have met the above restrictions.

In your table include the:

- names of the plants and fish you want to purchase
- total cost of the plants and fish you want to purchase
- total length of the fish you want to purchase

Go On

TROPICAL FISH

Name	Cost (per fish)	Length (in inches)	Characteristics
Algae Eater	\$1.45	1	bottom feeder; lays eggs
Angelfish	\$8.95	3	striped with long pointed fins; lays eggs
Catfish	\$1.95	1	bottom feeder with whiskers; lays eggs
Clown Barb	\$1.45	$1\frac{1}{4}$	orange and black stripes; lays eggs
Clown Loach	\$5.95	3	orange and black stripes; bottom feeder; lays eggs
Gourami	\$3.95	$2\frac{1}{2}$	pearl in color; lays eggs in bubble nests
Guppy	\$0.35	1	colorful fancy tails; bears live young
Mollie	\$2.45	$1\frac{1}{2}$	black in color; bears live young
Platy	\$0.95	$1\frac{1}{2}$	orange in color; bears live young
Neon Tetra	\$1.25	$\frac{3}{4}$	colorful blue and red bodies; lays eggs
Redtail Shark	\$5.95	3	dark gray in color with red tail; lays eggs
Silver Hatchets	\$2.95	$\frac{3}{4}$	silver in color; lays eggs

TROPICAL PLANTS

Name	Cost (per plant)	Length (in inches)	Characteristics
Elodea	\$0.75	8	floats or roots in gravel
Fan Plant	\$1.95	6	roots in gravel
Wisteria	\$2.95	12	roots in gravel
Sword Plant	\$5.95	12	roots in gravel

Go On

STOP



Session 2



Directions

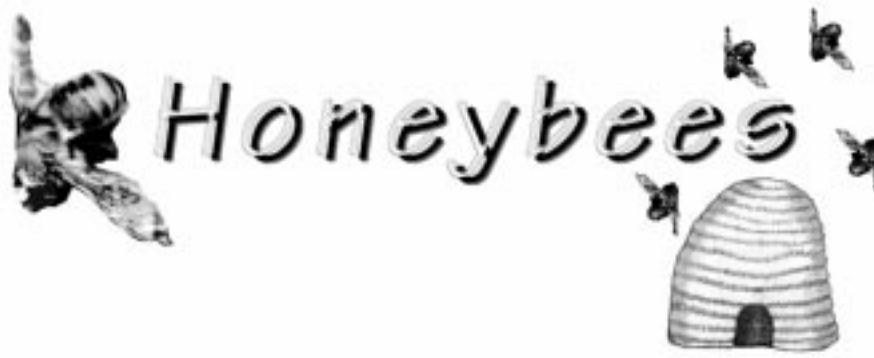
Show all of your work and write your answers directly in this booklet.

- 1 Your local high school marching band is marching in today's state fair parade. The band, composed of 126 students, usually marches in 21 rows of 6 students each. Due to illness, several band members are unable to march in today's parade.

As drum major, you must assist the band director in rearranging the students into rows of equal numbers of students. When you tried 4 students in each row, the last row was 1 student short. The results were the same when rows of 5 and 6 students were arranged. When you arranged the band into rows of 7 students, all rows were complete.

Use the above information to determine how many students showed up to march in the parade. In the box below, show your work and explain the process you used to find the number of students present on the day of the parade.

Go On



Directions

Numbers 2 through 4 are about honeybees. Show all of your work and write your answers directly in this booklet.



- 2** Each square inch of honeycomb contains approximately 25 cells. About how many cells would be found in a honeycomb that measures 8 inches by 12 inches? In the box below, provide the work that shows how you arrived at your answer.

Go On

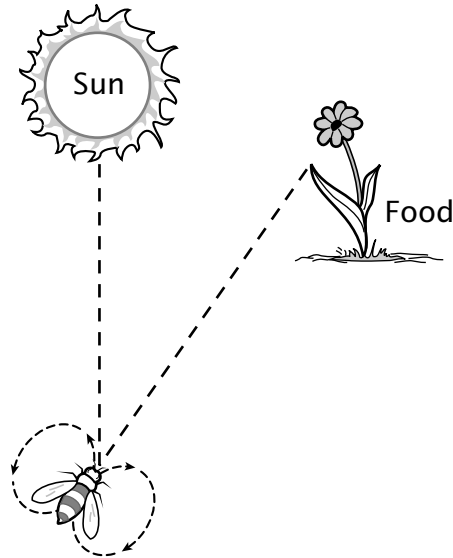
3



Use your protractor to help you solve this problem.

A honeybee shows the location of food to other bees by dancing a figure-eight pattern inside the hive. The imaginary line between the loops of the figure eight indicates the position of the food in relation to the sun, as shown below.

What is the measurement of the angle between the sun and the honeybee's food?



Go On



4

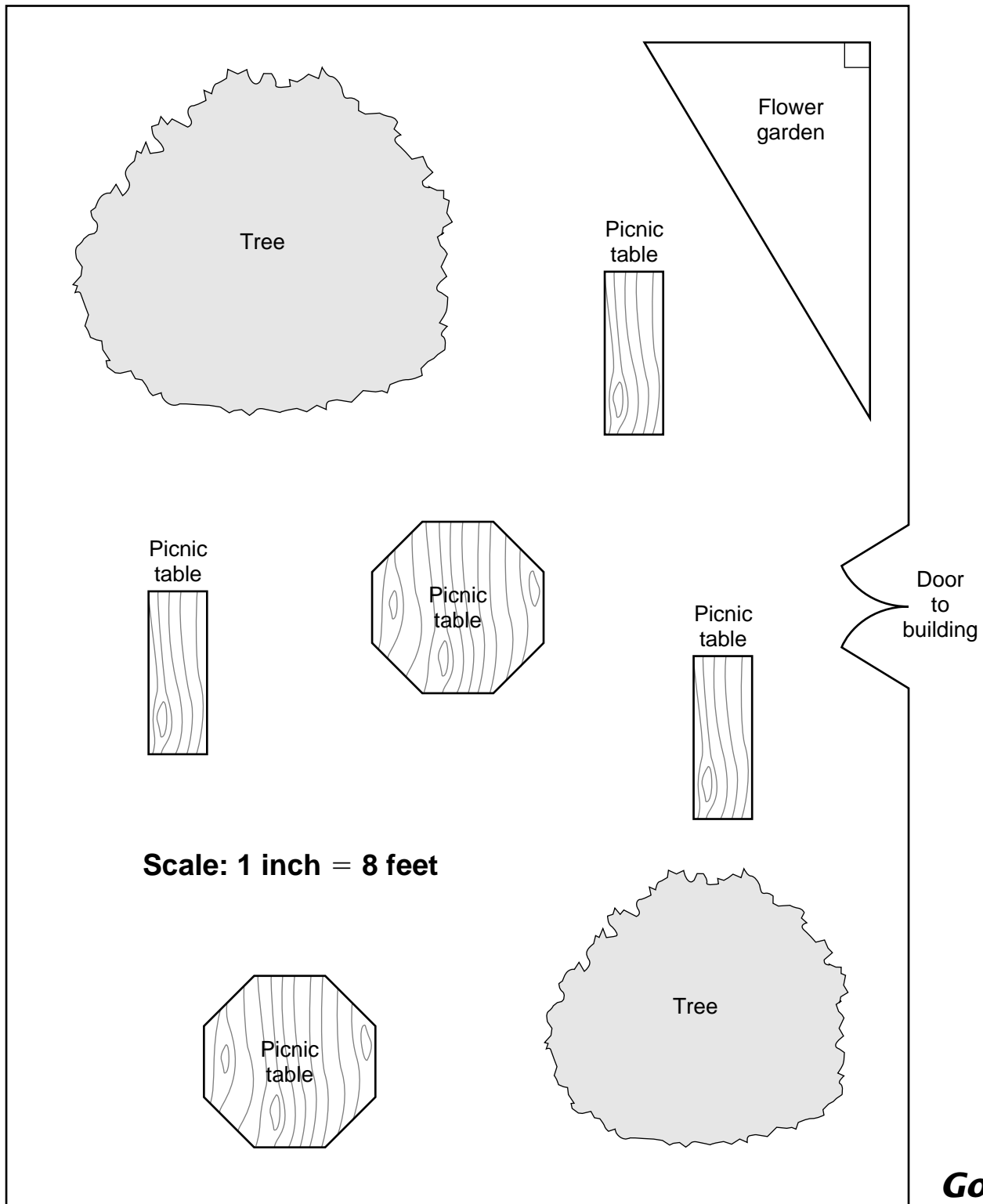
The honeybee must have a body temperature of at least 86° Fahrenheit ($^{\circ}\text{F}$) to be able to fly. What is this temperature in Celsius? In the box below, provide the work that shows how you arrived at your answer.



School Lunch Yard

Directions

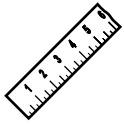
Numbers 5 through 7 are about creating an outside lunch yard at school. Show all of your work and write your answers directly in this booklet. Use the scale drawing to do Number 5.



Go On

The eighth graders at your school decided to create a plan for an outdoor lunch yard where students could eat their lunch during nice weather. Before approaching the principal, the students made a scale drawing to help them present their idea.

5



Use your ruler to help you solve this problem.



The students thought it would be nice to include a flower garden in the lunch area. What is the *actual* area of the flower garden? In the box below, provide the work that shows how you arrived at your answer.

6

The students want to plant flowers in rows to fit the garden's shape. The first row will have 4 flowers, the second row will have 8 flowers, and the third row will have 12 flowers. If the pattern continues, how many flowers will be in the *twelfth* row? In the box below, provide the work that shows how you arrived at your answer.

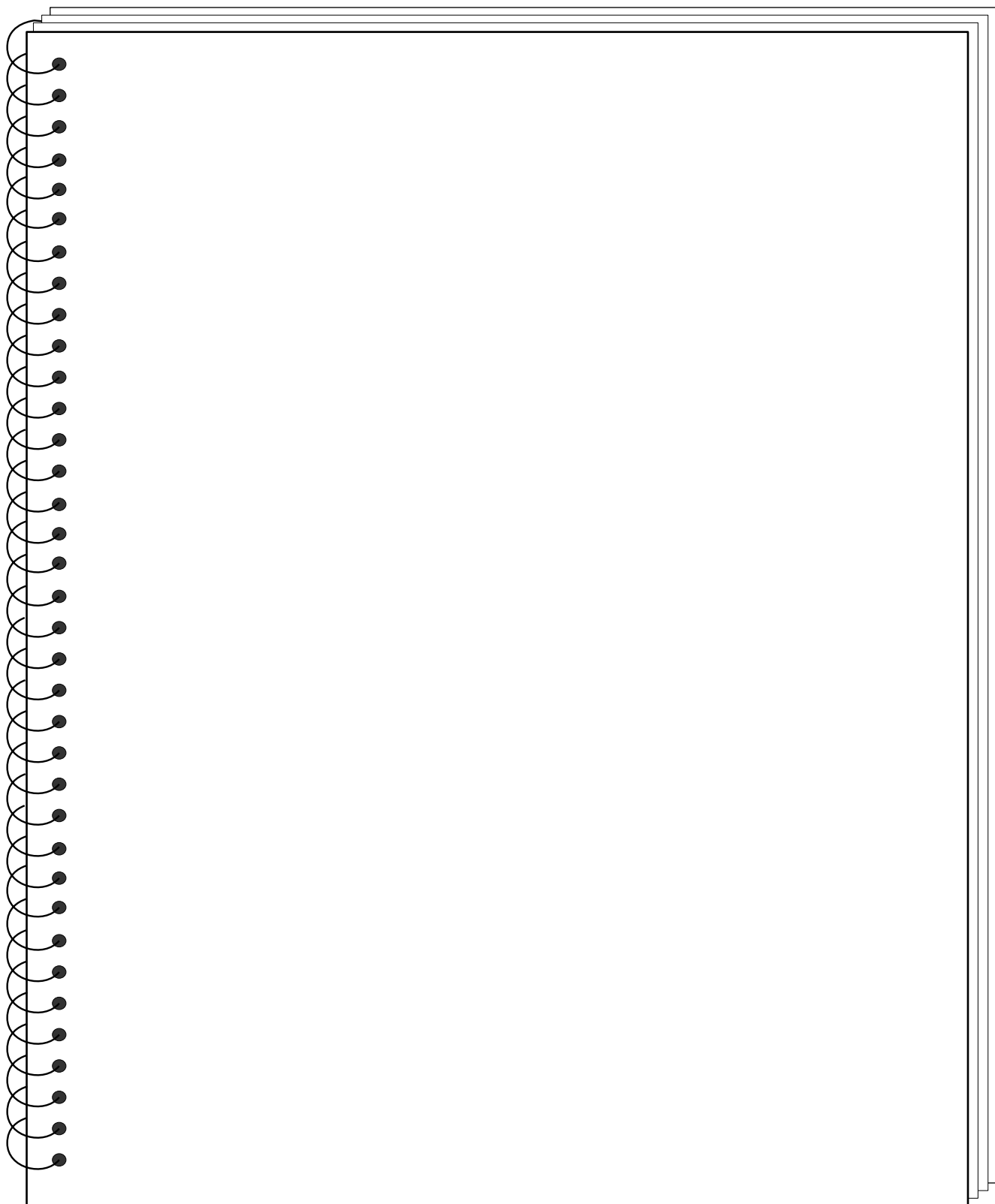
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- 7** The principal asked the eighth-grade students to research different kinds of garbage cans for garbage and recycling in the lunch yard. They found the following information.

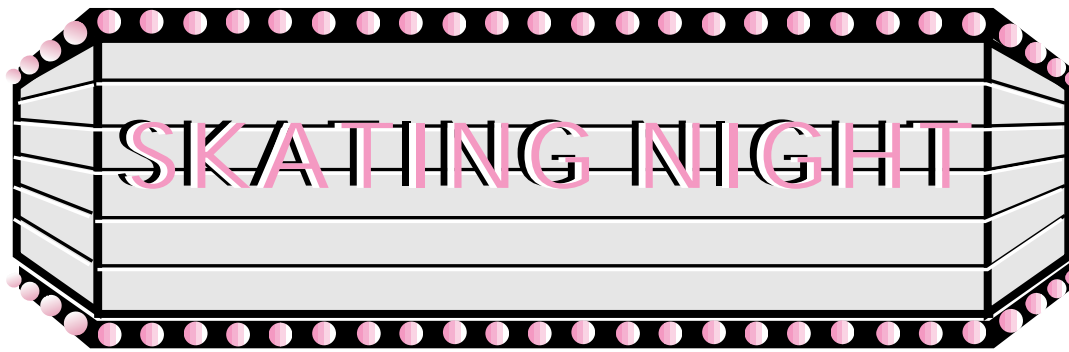
GARBAGE CAN FACTS

	Garbage Can A	Garbage Can B
Shape	cylinder	rectangular prism
Dimensions	3 ft tall with 1 ft radius	2 ft × 2 ft × 2.5 ft
Capacity	30 gallons	34 gallons
Material Used	galvanized steel	plastic
Cost	\$11.99	\$13.99

The students will need enough garbage cans to collect 165 gallons of garbage and recycled goods per day in the lunch yard. Which garbage can should the students recommend? On the notebook page on Page 25, write a memo to the principal recommending which garbage can should be purchased for the lunch yard. Use mathematics to justify your decision.



Go On



Directions

Numbers 8 through 10 are about a school skating night. Show all of your work and write your answers directly in this booklet.

- 8** The student council at your school wants to sponsor a family skating night at a local roller rink. The skating night is going to be a fundraiser to help purchase new sports equipment for the school. The students have discussed how to encourage ticket sales so that there will be a good turnout for the event.

They decide that each of the 5 student officers will call 5 eighth graders to tell them about the skating night. Each of those eighth graders will call 3 seventh graders. Assuming that no person is called more than once, how many seventh graders would be called? In the box below, provide the work that shows how you arrived at your answer.

Go On